



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,256	06/27/2003	Jinhun Joung	2003P07962 US	7768

7590 12/22/2006
Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

ROSENBERGER, FREDERICK F

ART UNIT	PAPER NUMBER
----------	--------------

2884

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/22/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/609,256

Applicant(s)

JOUNG ET AL.

Examiner

Frederick F. Rosenberger

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. Applicant is advised that no Information Disclosure Sheet was received with this application.
2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 11-13, 18-23, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamashita et al. (US Patent # 4,823,016).

With regards to independent claim 11, Yamashita et al. disclose a gamma camera comprising a plurality of bar detector modules **12** arranged in a three-dimensional array (Figure 4), each of said modules comprising a plurality of elongated

Art Unit: 2884

scintillation crystal bars **12₁**, **12₂** (Figure 1), each bar having two end surfaces and each bar arranged in a two-dimensional array (Figure 1) with respect to the end surfaces, and at least two photosensors **11** optically coupled to the end of the module.

With regards to independent claim 21, Yamashita et al. further discloses that the elongated surfaces are grounded and sealed with high reflectivity material (column 4, lines 36-39 and 54-56).

With regards to claims 12, 13, 22, and 23, Yamashita et al. disclose the use of two-dimensional position sensitive photomultiplier tubes for the photosensor (column 4, lines 30-33).

With regards to claims 18, 19, and 28, Yamashita et al. disclose that the elongated surfaces are grounded and sealed with high reflectivity material (column 4, lines 36-39 and 54-56).

With regards to claims 20 and 29, Yamashita et al. disclose that the detector can be used as a gamma-ray detector (column 4, lines 61-64). Thus, the device of Yamashita would be capable of being used for SPECT imaging.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2884

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-3 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. (US Patent # 4,823,016) in view of Joung et al. (Journal paper entitled "cMiCE: a high resolution animal PET using continuous LSO with a statistics based positioning scheme").

With regards to claim 1, Yamashita et al. disclose a gamma camera comprising a plurality of bar detector modules **12** arranged in a three-dimensional array (Figure 4), each of said modules comprising a plurality of elongated scintillation crystal bars **12₁**, **12₂** (Figure 1), each bar having two end surfaces and each bar arranged in a two-dimensional array (Figure 1) with respect to the end surfaces, and at least two photosensors **11** optically coupled to the end of the module.

Yamashita et al. further disclose a position calculator in the form of position calculating circuits **28**, **29**, and **30** (Figure 7). However, Yamashita et al. do not specifically disclose the determination of the spatial location of the scintillation

interaction according the claimed formula. Applicant does acknowledge that conventional estimators determine position based on a scale factor time R plus an offset (see equation (1) on page 12 of applicant's disclosure).

Joung et al. teach a position estimation in a scintillation crystal of a gamma camera using a statistics based positioning algorithm. Specifically, on page 1138, 1st column, Joung et al. teach the claimed equation applied to the PMT outputs of the gamma camera. Joung et al. further teach that such a method shows improvement over prior art positioning methods in terms of field of view extension, elimination of edge effect artifacts, spatial resolution improvement, and more uniform spatial resolution performance (page 1141, column 1).

Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply the statistics based approach, taught by Joung et al., to the conventional variable R used in the estimation of position in the scintillation bar so as to take advantage of the improvements in detection noted by Joung et al. (page 1141, column 1).

With regards to claims 2 and 3, Yamashita et al. disclose the use of two-dimensional position sensitive photomultiplier tubes for the photosensor (column 4, lines 30-33).

With regards to claims 8 and 9, Yamashita et al. disclose that the elongated surfaces are grounded and sealed with high reflectivity material (column 4, lines 36-39 and 54-56).

With regards to claim 10, Yamashita et al. disclose that the detector can be used as a gamma-ray detector (column 4, lines 61-64). Thus, the device of Yamashita would be capable of being used for SPECT imaging.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. and Joung et al., as applied to claim 1 above, and further in view of Joram et al. (US Patent Application Publication # 2005/0253073).

The combination of Yamashita et al. and Joung et al. disclose all the limitations of parent claim 1, as discussed above. However, Yamashita et al. only teach the use of photomultiplier tubes. Yamashita et al. does not explicitly teach the use of photodiode arrays.

However, the use of photodiode arrays in place of position-sensitive PMTs is well known in the art. For example, Joram et al. teach the use of photodiode array 8 (Figure 1; paragraph 35) as the light detector for a scintillator bar module 2. Joram et al. teaches that the use of a photodiode array overcomes the limitations of the prior art systems employing PMTs (paragraph 8) while providing a detector with good linearity and good position sensitivity with low noise (paragraph 19).

Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use photodiode arrays in place of PMTS as the photosensors so as to provide a detector with good linearity and good position with low noise, as taught by Joram et al.

Art Unit: 2884

9. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. and Joung et al., as applied to claim 1 above, and further in view of Dorenbos et al. (US Patent # 7,067,816).

The combination of Yamashita et al. and Joung et al. disclose all the limitations of parent claim 1, as discussed above. However, Yamashita et al. only teach the use of BGO as the scintillator crystals. Yamashita et al. does not explicitly teach the use of CsI, LaBr₃, or LaCl₃.

However, these scintillation crystals are well known in the art. For example, Dorenbos et al. disclose the use of BGO (column 1, lines 33-37), CsI (column 1, lines 30-32), LaCl₃ (column 2, lines 44-48), and LaBr₃ (Table 1) as known scintillator materials for use as gamma detectors.

It would have been obvious for one having ordinary skill in the art at the time the invention was made to select either BGO, CsI, LaCl₃, or LaBr₃ as the scintillation material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

10. Claims 14 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. (US Patent # 4,823,016), as applied to claims 11 and 21 above, and further in view of Joram et al. (US Patent Application Publication # 2005/0253073).

Yamashita et al. disclose all the limitations of parent claims 11 and 21, as discussed above. However, Yamashita et al. only teach the use of photomultiplier tubes. Yamashita et al. does not explicitly teach the use of photodiode arrays.

However, the use of photodiode arrays in place of position-sensitive PMTs is well known in the art. For example, Joram et al. teach the use of photodiode array 8 (Figure 1; paragraph 35) as the light detector for a scintillator bar module 2. Joram et al. teaches that the use of a photodiode array overcomes the limitations of the prior art systems employing PMTs (paragraph 8) while providing a detector with good linearity and good position sensitivity with low noise (paragraph 19).

Thus, it would have been obvious for a person having ordinary skill in the art at the time the invention was made to use photodiode arrays in place of PMTS as the photosensors so as to provide a detector with good linearity and good position with low noise, as taught by Joram et al.

11. Claims 15-17 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. (US Patent # 4,823,016), as applied to claims 11 and 21 above, and further in view of Dorenbos et al. (US Patent # 7,067,816).

Yamashita et al. disclose all the limitations of parent claims 11 and 21, as discussed above. However, Yamashita et al. only teach the use of BGO as the scintillator crystals. Yamashita et al. does not explicitly teach the use of CsI, LaBr₃, or LaCl₃.

However, these scintillation crystals are well known in the art. For example, Dorenbos et al. disclose the use of BGO (column 1, lines 33-37), CsI (column 1, lines 30-32), LaCl_3 (column 2, lines 44-48), and LaBr_3 (Table 1) as known scintillator materials for use as gamma detectors.

It would have been obvious for one having ordinary skill in the art at the time the invention was made to select either BGO, CsI, LaCl_3 , or LaBr_3 as the scintillation material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Both Miraldi (US Patent # 3,825,758) and Yamashita et al. (US Patent # 4,870,280) represent prior art elongated scintillation crystal bars for detection of radiation.

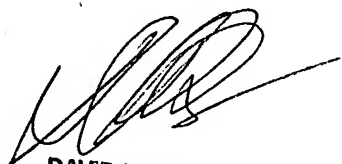
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is 571-272-6107. The examiner can normally be reached on Monday - Friday with flexible hours.

Art Unit: 2884

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Frederick F. Rosenberger
Patent Examiner
GAU 2884



DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800